Workplan for Fiscal Year 2005
August 1, 2004

I. Program Title Anadromous Fish Restoration Program (AFRP) - Central Valley Project Improvement Act (CVPIA) 3406(b)(1)

II. Responsible Entities

	Agency	Staff Name	Role
Lead	USFWS	Russ Bellmer	Program Manager, Anadromous Fish Restoration Program
Co-Lead	USBR	Ken Lentz	Program Liaison, United States Bureau of Reclamation(USBR)/Anadromous Fish Restoration Program

III. Program Objectives

The objectives for the Anadromous Fish Restoration Program (AFRP) can be found in the Final Restoration Plan for the Anadromous Fish Restoration Program Restoration Plan. These objectives are listed below:

- Improve habitat for all life stages of anadromous fish through provision of flows of suitable quality, quantity, and timing, and improved physical habitat;
- Improve survival rates by reducing or eliminating entrainment of juveniles at diversions;
- Improve the opportunity for adult fish to reach their spawning habitats in a timely manner;
- Collect fish population, health, and habitat data to facilitate evaluation of restoration actions;
- Integrate habitat restoration efforts with harvest and hatchery management; and
- Involve partners in the implementation and evaluation of restoration actions.

The AFRP is one of five Central Valley Project Improvement Act (CVPIA) programs being integrated with the California Bay-Delta Program (CBDP) Ecosystem Restoration Program (ERP). To facilitate this integration, the above objectives are included in the CBDP ERP Draft Stage 1 Implementation Plan. These objectives are also complementary to other goals and objectives listed in the Draft Stage 1 Implementation Plan and would help address the objectives of the CBDP's Multi-Species Conservation Strategy and the Biological Opinion for the CVPIA.

The AFRP shares CBDP's vision of the Single Blueprint concept which provides a unified and cooperative approach to restoration. The AFRP is committed to integrating its activities with the Ecosystem Restoration Program's actions and using a scientifically-based adaptive management approach to achieve AFRP objectives.

The AFRP Restoration Research Gap Analysis which was initially presented in the Fiscal Year 2003 Workplan for each of the Central Valley watersheds is presented again in this workplan in **Section VII.**

IV. Status of the Program

The Final Restoration Plan for the Anadromous Fish Restoration Program (Restoration Plan) was completed in 2001 to guide the long-term development of the AFRP. The Restoration Plan provides a programmatic-level description of the AFRP, and will be used to guide implementation of all sections of the CVPIA that contribute to the goal of making all reasonable efforts to at least double natural production of anadromous fish. The Restoration Plan presents the goal, objectives, and strategies of the AFRP, as well as a list of reasonable actions. The Restoration Plan identifies the need for partners, local involvement, public support, adaptive management, and flexibility as key attributes of the AFRP approach to making all reasonable efforts to at least double natural production of anadromous fish.

To implement this plan, the USFWS established five federal Habitat Restoration Coordinator (HRC) positions, each assigned a specific geographic area within California's Central Valley. In their assigned area, each HRC represents the AFRP, develops and nurtures partnerships, develops projects with partners that contribute to making all reasonable efforts to at least double natural production of anadromous fish, and oversees all aspects of implementation of projects in which the AFRP invests funds. In 1998, the AFRP added three more HRC's from the California Department of Fish and Game (DFG) to this effort; one from three of the DFG regions within the Central Valley, to provide assistance to the USFWS and to ensure close coordination with the DFG, the State agency with primary responsibility for restoration of anadromous fish habitat. Together, the USFWS and DFG HRC's form an interagency team to coordinate, develop and implement restoration projects consistent with the goal, objectives, strategies, processes and priorities described in the Restoration Plan. Anadromous fish restoration activities associated with spawning gravel replenishment, flow acquisition and screening projects are funded concurrently through other CVPIA programs.

AFRP derives managerial, administrative and technical support from the Sacramento Fish and Wildlife Office, including assistance with environmental compliance processes (NEPA, ESA, and FWCA) and completion of science-based studies essential to AFRP habitat restoration efforts (IFIM's, salmonid passage studies, habitat mapping, spawning surveys, etc.).

The AFRP and several other CVPIA projects are functionally integrated with the CBDA ERP Proposal Solicitation Process (PSP), resulting in peer reviewed projects potentially available for AFRP funding. As part of this functional integration, when AFRP fiscal year funding coincides with the CBDP Proposal Solicitation Process (PSP), potential AFRP projects undergo CBDA-related scientific and technical review to help ensure the best and highest priority projects are implemented and to ensure the most efficient use of funds. During years when the AFRP fiscal

year funding does not fall within a scheduled CBDP PSP, AFRP restoration project proposals are still peer reviewed through the CBDP.

Because the FY2005 "general" CBDA Proposal Solicitation Process is proposed for winter of FY2005 and the AFRP FY2005 funding year will not be synchronous with the CBDA Proposal Solicitation Process, FY2005 AFRP project proposals that fill AFRP restoration gaps will be peer-reviewed through CBDP, and thenfunded and implemented as was done in FY2003. Because of a $2,000,000 budget reduction in FY2004, the AFRP was only able to fund ongoing AFRP projects.

Upper mainstem Sacramento River and upper Sacramento River tributaries

This area extends from the Sacramento River mainstem and all tributaries between Keswick Dam in the north and Stony Creek in the south. There is currently one federal AFRP Habitat Restoration Coordinator (HRC), one state HRC, and one federal Assistant HRC dedicated to the implementation of restoration actions in this area. AFRP duties in this geographic region are expanding. This includes technical assistance to local watershed groups and support of their efforts to develop watershed assessment and management documents as well as restoration projects.

Restoration efforts in the upper mainstem Sacramento River and Sacramento River tributaries geographic area focus on the major AFRP objectives listed in Section III, Program Objectives. AFRP funded and managed projects to address data gaps in fish management (e.g., Sex Reversal of Chinook Salmon and Genetic Identification of the Endangered Winter-run Chinook Salmon) and supported watershed restoration activities with many local watershed work groups.

The AFRP HRCs continue to serve as technical advisors for the Battle Creek Conservancy, Cow Creek Conservancy, Bear Creek Watershed Group, Shasta West Watershed Group, Cottonwood Creek Watershed Group, and the Deer Creek Watershed Conservancy. The HRCs also support local watershed groups associated with Lower Clear, Mill, Reeds, and Red Bank creeks as well as the Sacramento River Conservation Area Forum and the efforts of the CALFED Environmental Water Program. In 2004, the California Bay Delta Authority (CBDA) continued to fund the Battle Creek Restoration Project and continued the planning, permitting and implementation processes. A Cow Creek watershed management planning effort is nearing completion. This plan will identify projects that will accomplish the goals identified in the completed 2001 Cow Creek Watershed Assessment. This watershed management plan will also identify specific restoration actions necessary to achieve watershed goals and describe how an adaptive management process will guide implementation of identified restoration actions. The La Barranca Restoration Project initiated an environmental review and hydraulic engineering analysis of options aimed at restoring floodplain connectivity of the La Barranca Unit (part of the meander belt, upper mainstem Sacramento River) which is nearly complete.

The Lower Butte Creek Project is divided into three phases, and Phases I and II have been completed. Phase I included an analysis of existing conditions and established a working group

comprised of agency representatives, landowners, water district managers, wetland managers and non-profit representatives. This working group identified barriers to fish passage on Butte Creek (i.e., water control structures). This resulted in a list of structural modifications and proposed alternatives to improve fish passage through the various stream reaches of Butte Creek. Phase II used this list of alternatives and associated environmental compliance processes to select preferred actions, resulting in design completion and construction. Phase III, the construction phase, is underway and will take the plans and specifications and permits from Phase II and funding from CBDA and AFRP and the agency partners and complete construction of the preferred alternatives. Projects already completed in Phase III Construction are: Sutter Bypass - EW Diversion Dam, Weir #5 and Weir #3; Butte Sink - North Weir, End Weir, Morton Weir, Field & Tule Turnout and Mile Canal Turnout; Sanborn Slough Bifurcation Dam; and, Drumheller Slough Adult Fish Barrier. Projects funded and ready for Phase III Construction are: West of Butte Creek - White Mallard Dam; Butte Sink – Drivers Cut and RD 833 Adult Fish Barriers. Plans are nearing completion in the Sutter Bypass with the purchase of the Giusti water right, decommissioning of the Giusti diversion and structural upgrades to the Giusti Weir and Weir #1 for fish passage and water surface control. Additional non-structural Phase III Projects include the execution of an MOA for the east side of the Sutter Bypass and development of a fish passage restoration plan that will review the small pumping plants and establish minimum flows for fish passage for both borrow channels of the Sutter Bypass.

Lower Sacramento River and Delta tributaries

This AFRP geographic area extends from the Feather River south to the Calaveras River. Each of the seven watersheds within this area has unique characteristics and environmental limiting factors. There are currently two federal HRC's, one state HRC and one federal assistant HRC dedicated to the implementation of restoration actions in the Lower Sacramento River and Delta tributaries. AFRP duties in this geographic region are expanding as new watershed and stakeholder groups become organized, restoration plans have been developed and greater numbers of restoration activities have been started.

Restoration efforts in the Lower Sacramento River and Delta tributaries region have focused on the major AFRP objectives listed in Section III, Program Objectives. Investments in the lower Sacramento River tributaries region included temperature modeling on the American River, geomorphologic and fish life history studies on the Yuba River, and fish passage studies at Daguerre Point Dam (DPD) on the Yuba River. Of particular interest is the data obtained from the VAKI Riverwatcher system installed in both fish ladders at DPD. This system uses a combination of high-speed cameras and infrared sensing technology to detect movements of fish through the ladders. These data can be used to analyze species movement and supplement existing methods for tracking fish population trends (e.g., carcass surveys). Ongoing projects in this region include: 1) the Biological Assessment of Green Sturgeon in the Sacramento-San Joaquin Watersheds – the final report was submitted July 9,2004; 2) Construction of a permanent exclusion device (e.g., leaky-dike barrier) in waterway 13, in the Fall of 2003 to keep salmon from accessing the Gold Fields, was completed and measurements above and below the exclusion device (hydraulic head) and fish monitoring (presence/absence) are scheduled for Fall

2004 and 2005; and 3) year one juvenile ½ tagging completed for our juvenile Chinook salmon and steelhead life history evaluation.

The AFRP continues to participate in the Yuba River's State Water Resources Control Board Revised Decision 1644 process. This settlement process will have a tremendous influence in guiding future restoration efforts on the Yuba River. The AFRP also continues to provide technical assistance and leadership to management and stakeholder groups on the American, Feather, and Yuba rivers. Quite recently the AFRP has become involved in the collaborative investigation of watershed conditions in the Lower Bear River below Camp Farwest Reservoir and expects that this effort will identify and classify habitat for the needs of anadromous fish species.

In the Delta tributaries region the AFRP provided additional funding for the SHIRA spawning gravel project on the Mokelumne River. On the Calaveras River, AFRP-provided additional funds for a fish ladder retrofit and an ongoing salmonid passage, stranding, and life-history study. On the Cosumnes River, the AFRP funded a downstream passage and predation study of fall-run Chinook salmon. Funding was also continued for the Central Valley genetic study on Chinook salmon.

San Joaquin Basin tributaries and mainstem San Joaquin River

This AFRP geographic area includes the Stanislaus, Tuolumne and Merced rivers including the mainstem San Joaquin River. Each of the watersheds within this AFRP geographic region has unique characteristics and environmental limiting factors. There are currently two AFRP HRC's, one federal assistant HRC, and one state HRC dedicated to the implementation of restoration actions in the San Joaquin Basin tributaries and the mainstem San Joaquin River. AFRP duties in this geographic region are expanding as new watershed and stakeholder groups become organized, restoration plans are developed and large-scale channel restoration projects and greater numbers of restoration activities are implemented. HRC's served as technical advisors on watershed related groups such as the Stanislaus Temperature Modeling Group, Stanislaus Fish Group, Tuolumne River Technical Advisory Committee, Tuolumne River Coalition, Merced River Stakeholder Group, Merced River Education Initiative, East Merced Resource Conservation District Steering Committee, Western Stones Planning Group, Community Alliance for Family Farms Steering Group, the Vernalis Adaptive Management Program, and the San Joaquin River Management Program.

Restoration efforts in the San Joaquin Basin tributaries and mainstem San Joaquin River region focus on the major AFRP objectives listed in Section III, Program Objectives. Large-scale channel restoration projects to improve the geomorphologic functions of basin rivers and to control predation on juvenile salmonids continue to be developed and funded. On the Stanislaus River, the AFRP continues to fund restoration of spawning and rearing, floodplain and side channel habitat in the Lover's Leap and Knights Ferry areas. An AFRP funded weir with a high-tech fish counter will continue counting the fall-run Chinook salmon in September (http://stanislausriver.com/). A restoration plan for the Stanislaus River is still under

development. On the Tuolumne River, restoration of the 2.6 mile 7/11 reach was completed; efforts to restore the MJ Ruddy reach are underway and planning has started to restore the Warner-Deardorff reach. On the Merced River, the AFRP funded and completed the Ratzlaff segment of the Robinson Ratzlaff Mining Reach in-channel habitat restoration project and is funding conceptual planning efforts for the next phase, Western Stone reach restoration.

V. FY 2004 Accomplishments

During fiscal year 2004, the AFRP was limited to funding only ongoing projects (no new projects) due to an extreme reduction to the FY 2004 AFRP budget ($2,998,820).

Upper mainstem Sacramento River and upper Sacramento River tributaries

Ongoing project accomplishments

(1). Mainstem Sacramento River watershed: a) continued development of an environmental compliance and hydraulic evaluation of the La Barranca project (Phase II); and, b) completed markers to identify winter-run Chinook salmon (part of effort to determine the genetic impacts of the winter-run Chinook salmon captive broodstock program on the wild winter-run Chinook salmon population through genetic analysis).

(2). Continued assistance to the Cow Creek watershed management group in their watershed management plan proposal preparation. Completion of this plan will have incorporated all AFRP Restoration Plan actions and evaluations for Cow Creek that address limiting environmental factors to doubling anadromous fish populations in this stream.

(3). Cottonwood and Deer creek watersheds: HRCs continued to provide coordination, technical guidance, and proposal development of the CALFED Environmental Water Program (EWP) on Deer and Clear creeks, two of the five EWP priority streams.

(4). Lower Butte Creek watershed: a) continued funding Ducks Unlimited as the project manager of the Lower Butte Creek Project; b) completed engineering designs and necessary environmental documentation on all five reaches of the Project; c) completed Phase II on the Butte Sink and Sutter Bypass West Side reaches and nearing completion on the White Mallard and Associated Diversions reach; d) developed a Memorandum of Understanding by stakeholders and agency representatives of a restoration plan to address the large number of small pumps and multitude of diversions and weirs located on Butte Slough and Sutter Bypass East; e) constructed three weirs located on the west side of the Sutter Bypass; f) constructed five water control structures in the Butte Sink; g) initiated construction of two adult fish barriers; and, h) negotiated purchase of a long-term water right for in-stream flows in on west side Sutter Bypass.

(5). Feather River watershed: evaluated limiting factors for sturgeon and salmon passage and spawning which is continuing through the FERC settlement process for Oroville Dam relicensing

FY 2004 ongoing and new funded projects

(1). Butte and Big Chico creeks: provided additional funding for continued implementation of a 10- year salmon life history study, $110,162. Interim study findings were: 1) juvenile residency time in Butte Creek ranged from 56 days to 71 days in 1998 through 2000; 2) sdult spring-run chinook salmon (SRCS) escapement during 1999 and 2000 were 3,679 and 4,119 fish respectively, exceeding the 2000 fish doubling goal both years; and 3) ocean tag recoveries from Butte Creek adults captured in the commercial/sport fishery suggest that some portion of Butte Creek SRCS return to spawn as age four fish. These data served as the basis for restoration projects in the migratory pathway of Butte Creek spring-run Chinook as well as provided a baseline for post-project evaluation of effectiveness. In addition, Research Project data are currently being incorporated into the NOAA Fisheries spring-run Chinook salmon recovery effort, the fishery management plan conservation objectives for the Pacific Fishery Management Council, and the Interagency Ecological Program Sacramento River Delta Operations Plan.

(2). Continued to assist locally led efforts to facilitate coordination of the Butte Sink/Sutter Bypass stakeholders (11332-0-J006), $100,000. This Project funds the facilitation and coordination of the many stakeholders and interested parties and agencies that are involved in the Lower Butte Creek Project, a region of exceptional waterfowl and fishery habitat. Other Project activities include Project Tours, outreach and education and attendance of CBDA/ERP associated meetings.

(3). Funded the permitting phase of the Drumheller Slough 5-points screen project, $67,000. This Project looks at the final alternative for the West of Butte Creek Drumheller Slough-5 points fish screen and alternative routing of the RD 1004 diversion from Butte Creek. The final plan will amend the existing Negative Declaration/FONSI and Biological Assessment.

(4). Sutter Bypass Eastside contract (11332-0-J004, modification 3) (Butte Creek), $100,000. This Project will develop a Memorandum of Understanding now in final draft form and out for legal review to set the stage for the development of a fisheries management plan for the Sutter Bypass and Butte Slough. The proposed plan will address issues and set priorities on small pumping plant screens, minimum fish flows during dry years and structural upgrades of remaining water control structures.

Lower Sacramento River and Delta tributaries

Ongoing project accomplishments

(1). Yuba River watershed: a) replaced the existing temporary outlet barrier with a permanent "leaky-dike" barrier to prevent the migration of Yuba River Chinook salmon and steelhead into the Goldfields; b) completed year one of tagging for juvenile life history study; c) completed year one sampling for SHIRA study; and d) continued negotiations with key lower Yuba River Stakeholders involved in the State Water Resources Control Board Revised Decision 1644.

(2). The objectives of this applied research is to develop predictive tools that will: 1) reduce, to the extent possible, the uncertainties in the performance of identified temperature control actions that could be implemented to improve the management of cold water resources in the Folsom/Natoma Reservoir system and the lower American River, and 2) be available for daily operations, planning, and salmon and steelhead habitat studies by other project operators and other stakeholders. Completed first year of a two year project (completion date is September 26) sampling and modeling of the Lower American River temperature reduction modeling project.

(3). Bear River watershed: a) identified fish passage impediments on Dry Creek, tributary to Bear and b) developed a baseline conditions study for the lower Bear River.

(4). Calaveras River watershed: a) completed fall-winter 2003-04 adult and juvenile Chinook salmon surveys downstream of Bellota Weir; b) retrofitted Bellota Weir Fish ladder; and, c) completed first year report of the Lower Calaveras River salmonid life-history study.

(5). Cosumnes River watershed: a) documented upstream passage for fall-run Chinook salmon as part of the project to assess flow requirements for salmon passage; b) estimated flow augmentation needs and water sources to allow upstream salmon passage in the fall; and, c) continued salmon barrier improvement work.

(6). Mokelumne River watershed: a) added 1,200 cubic yards of gravel in bar configurations perpendicular to flow as part of the first year of the Mokelumne River Spawning Habitat Improvement Project; b) completed analysis of sediments above and below Murphy Creek to assess post-dam processes and changes, providing a baseline to minimize disturbances in downstream rearing areas; and, c) completed two peer reviewed UC Davis publications resulting from of the interdisciplinary project approach to rehabilitate salmonid spawning habitat.

FY 2004 ongoing and new funded projects

(1). Mokelumne River Spawning Habitat Improvement Project (11332-3-J007, contract modification 1), $29,400. Additional dollars are being used to purchase gravel in 2004 and complete this two year project. Similar past investments in spawning habitat improvement

have resulted in immediate increased utilization by Chinook salmon spawners. Similar results are anticipated with partnered investment with East Bay Municipal Utility District.

(2). An interdisciplinary approach to gravel augmentation on the Mokelumne River (11332-2-G003 Mod 1), $47,000. Funds were provided to manage a large volume of field data, coordinate it with other databases and transform it into easily understandable management information suitable for a variety of stakeholders. This funding will also allow modeling gravel movement at a wider range of flows.

San Joaquin Basin tributaries and mainstem San Joaquin River

Ongoing project accomplishments

(1). Stanislaus River watershed: a) continued field testing and design modification of the Vaki infrared fish counter during the fall-run escapement from September 2003 through April 2004; b) completed a draft plan to restore anadromous fish habitat in the Stanislaus River http://www.delta.dfg.ca.gov/srfg/); c) completed an annual rotary screw trap monitoring efforts at Caswell State Park; d) environmental permitting is in progress for spawning and rearing, floodplain and side channel habitat restoration in the Lover's Leap and Knights Ferry reaches; e) continued to plan and coordinate with USBR for spawning gravel introduction below Goodwin Dam; and, f) completed riparian revegetation and floodplain restoration on the Mohler Tract.

(2). Tuolumne River watershed: a) continued channel and floodplain restoration at the 7/11 materials restoration site; b) reviewed preliminary appraisals for the MJ Ruddy restoration project by the Department of Interior (restoration and construction is anticipated to start in September of 2004); c) completed preliminary design engineering and environmental permitting on the Warner-Deardorff channel and floodplain restoration site in preparation for the CBDA funded and AFRP managed Warner-Deardorff restoration project; d) initiated the environmental permitting, design engineering and pre-project monitoring at the Tuolumne Special Run Pool 10 site; e) continued third-year post-project monitoring of the Grayson River Ranch floodplain restoration project (conservation easement) on the Tuolumne River; f) developed ~~of~~ an interpretive and education facility concept on the upper Tuolumne River with Stanislaus County; g) amended Sediment Management Plan agreement to incorporate short term habitat needs and adaptive management methods to guide future gravel augmentation management practices; and h) completed the Tuolumne River Technical Advisory Committee's scope of work for the Tuolumne River gravel transfusion project to include additional gravel supply methods.

(3). Merced River watershed: a) completed preliminary results of hydraulic modeling of fish habitat benefits of post-restoration at the Robinson Ranch Reach (the AFRP hired the USFWS Energy and In-stream Flow Branch to conduct Physical Habitat Simulation studies of the area); b) completed preliminary design engineering and landowner coordination at the lower Western Stones restoration site; c) completed all three Adaptive Management Forum

(AMF) reports (Tuolumne, Merced, and Clear creek reports are available on the AFRP web site); d) completed water temperature data assessment by Merced Irrigation (available on the AFRP web site); e) purchased 20 water quality test kits to encourage landowner water testing in coordination with the East Merced Resource Conservation District; f) initiated negotiations with the local mining industry concerning reclamation plans for Bettencourt Ranch mining project; and, g) continued support of the Merced River Dredger Tailings Reach phase I adaptive management studies and restoration.

(4). Mainstem San Joaquin River: Completed and incorporated San Joaquin River National Wildlife Refuge wetlands plans into hydraulic modeling efforts funded by AFRP to evaluate proposed non-structural flood control management alternatives on the Refuge.

(5). San Joaquin Basin: a) completed 75% of a CDFG riffle atlas study to provide a comprehensive San Joaquin Basin riffle inventory; b) completed draft feasibility study report for developing a long-term aggregate source for San Joaquin tributary channel restoration projects; c) completed 80% of a CDFG study to read archived Chinook salmon scale samples from the San Joaquin Basin to be used to update a salmon population model that assists alternative flow management evaluations on the tributaries.

(6). Comprehensive program accomplishments included: a) renovation of existing website to provide more user-friendly access to information; and, b) updating and expanding scope of information available on the web site.

<u>FY 2004 ongoing and new funded projects</u>

(1). Two Mile Bar Spawning habitat/floodplain restoration, Phase I. This project will restore the floodplain and sediment processes in a critical spawning and rearing reach of the Stanislaus River. Environmental permitting is underway to include floodplain and side-channel restoration. The California Department of Water Resources (Four Pumps Mitigation) has contributed $500,000 to the project.

(2). Chinook salmon and steelhead life history evaluation, (11332-0-G026), $9,576, was continued to include 2004 analysis and reporting of fish passage data (e.g., VAKI).

(3). AFRP project development data needs, ($130,866). These expenditures covered data development for a sediment study on Murphy Creek, a tributary to the Mokelumne, Merced River stakeholder group facilitation, a mineral appraisal for MJ Ruddy project on the Tuolumne River, project proposal preparations, and an adjustment to a Tuolumne River sediment management plan to include steelhead.

VI. Tasks, Costs, Schedules and Deliverables

A. Narrative Explanation of Tasks.

1.0 Program management

1.1 Program management (STFWO) - The USFWS Anadromous Fish Restoration Program (AFRP) Manager (PM) is responsible for managing the AFRP. The Assistant AFRP Program Manager reports directly to the AFRP PM and implements the AFRP. The program develops all grants and cooperative agreements and implements the overall program including outreach, coordinating with stakeholders, identifying funding partners and funding peer-reviewed restoration projects.

1.2. Program management liaison - The US Bureau of Reclamation (USBR) Liaison coordinates AFRP activities between the AFRP and the USBR and assists in developing and implementing the overall program including outreach, coordinating with stakeholders, and identifying partnering funds.

1.3 Program implementation - The Habitat Restoration Coordinators (HRC) identify restoration priorities, develop and nurture restoration partnerships, review proposals within the CBDA ERP Proposal Solicitation Process framework, recommend projects for AFRP funding, manage project deadlines and deliverables and implement the AFRP. The Assistant HRC's assist the AFRP PM, the Assistant PM, and HRC's on all AFRP work.

1.4 Program implementation (Red Bluff Fish and Wildlife Office (RBFWO)) - Same as 1.3 above.

1.5 Management/Administrative support (SFWO) - The SFWO provides support to the AFRP in management, interagency program coordination, external affairs and administration.

2.0 Technical Support

2.1 Sacramento Fish and Wildlife Office:

2.1.1 Instream flow evaluations (e.g., Incremental Flow Instream Methodology (IFIM)) – SFWO biologists carry out AFRP directed studies, like IFIM, in the Sacramento and San Joaquin basin rivers and tributaries. These activities and instream flow requirements for CVPIA, are covered under a separate program, 3406 (b)(1)(B).

2.1.2 Environmental compliance – SFWO staff completes documents for AFRP projects related to the National Environmental Policy Act, Fish and Wildlife Coordination Act, National Historic Preservation Act of 1966, and other requirements, as requested by AFRP.

2.1.3 Endangered Species Act compliance – In relation to the Endangered Species Act, the AFRP Program Manager coordinates and consults as appropriate, with the SFWO, on any proposed restoration activities of which AFRP is the lead.

2.2 California-Nevada Office (CNO): Realty program provides realty support services to the AFRP.

3.0 Project funding and implementation:

For FY 2005, the AFRP has identified approximately $6.7 million in ongoing and new restoration projects (See Table 2). Table 2 identifies ongoing and new watershed restoration projects that could be implemented in FY 2005 AFRP dependent upon peer reviews and funding availability.

(1). Tuolumne River watershed - The MJ Ruddy restoration project on the Tuolumne River requires an additional $1,400,000 for monitoring and revegetation work, of which AFRP plans to provide $715,000 in FY05. This is an increase in overall project costs due to a re-appraisal of the mining and development value of the property. The existing funding approved through the 2002 CalFed Proposal Solicitation Process retains a limited authority to spend those funds before the end of FY07. Any additional delay in project implementation (i.e., funding) could jeopardize this large-scale Tuolumne River restoration project, and risk loss of an existing project-related fund commitment of $6.4 million--$3.2 million of CVPIA AFRP funds and $3.2 million of CalFed Bay Delta Program funds.

(3). Big Chico Creek watershed - Iron Canyon fish ladder on Big Chico Creek is a project proposed for FY05 AFRP funding. Iron Canyon is a major passage challenge to spring-run Chinook salmon and steelhead, and participating in this effort in FY 2005 will allow leveraging of $700,000 in project-related Resource Legacy Grant funds. The AFRP has already invested $125,000 in a FY99 project in developing an engineering design for this complex fish passage facility. In FY2000, the AFRP invested another $500,000 in the acquisition of Simmons Ranch property above Iron Canyon, part of a $3.5 million cofunded investment with the David and Lucille Packard Foundation and the Fish and Wildlife Foundation. The Simmons Ranch addition provides valuable spawning and holding habitat for spring-run Chinook salmon and steelhead.

Table 2. AFRP FY 2005 project planning list showing prioritized ongoing and new projects.

Project	FY05 AFRP Funding	Total Estimated AFRP Project Cost
Ongoing Projects		
Test and Demonstrate a Portable Alaskan Weir to Count and Characterize Runs of Anadromous Salmonids in the Stanislaus River	$100,000	$300,000
VAKI Monitoring and Analysis (3-year study FY05-07) (Yuba River)	$65,561	$65,561
Continuation Lower Calaveras salmonid life history limiting factor analysis	$180,000	$210,000
Amendment request for the sex-reversal study (UCD)	$117,000	$117,000

Project	FY05 AFRP Funding	Total Estimated AFRP Project Cost
Iron Canyon Fish Ladder (Big Chico Creek)	$250,000	$700,000
Modify life history/eval in lower Yuba River to include tag recovery and analysis of wild stock	$30,000	$30,000
Continue improving passage of salmonids at diversion dams and barriers (Cosumnes River)	$125,000	$125,000
Mokelumne River spawning habitat improvement project	$30,000	$30,000
Lover's Leap & Knights Ferry Floodplain & Side-channel Restoration outreach (Stanislaus River)	$150,000	$150,000
Restoration plan development and outreach (Stanislaus River)	$100,000	$200,000
MJ Ruddy revegetation and monitoring (Tuolumne River)	$715,000	$1,430,000
Wing dam gravel purchase and screening (Merced River)	$75,000	$150,000
SHIRA-based analysis, Phase II (Yuba River)	$161,809	$161,809
Sutter bypass eastside, Mod. 3 (MOA/Restoration Plan- Butte Creek)	$125,000	$125,000
Butte and Big Chico creeks salmon life history	$165,000	$330,000
Continue to assist locally led efforts to facilitate coordination of the Butte Sink/Sutter Bypass stakeholders	$100,000	$300,000
Juvenile salmon outmigration monitoring at Caswell	$100,000	$100,000
Subtotals	**$2,589,370**	**$4,524,370**
New Projects		
Mill Creek fish passage study	$150,000	$300,000
Stream habitat restoration on the Sierra College campus (Gregg Bates) (Dry Creek)	$100,000	$100,000
Secret Ravine Channel Habitat Restoration (Dry Creek)	$120,000	$120,000
Hatchery Proportion Study	$100,000	$300,000
Dos Rios conservation easement (add-on to Two-Mile Bar project-Tuolumne River)	$50,000	$100,000
Life-stage contribution study (Merced & Tuolumne expansion)	$250,000	$600,000
American River steelhead life history	$100,000	$100,000
Mokelumne River side-channel restoration	$53,600	$53,600
Cottonwood Creek geomorphological analysis	$100,000	$100,000
One-mile Dam modification and gravel supplementation project- City of Chico (Big Chico Creek)	$175,000	$175,000
Lower Bear River existing conditions study	$100,000	$100,000
Antelope Creek fish passage project	$60,000	$60,000
Deer Creek (upper) erosion reduction	$50,000	$50,000
Life-stage contribution study (Stanislaus River)	$250,000	$600,000
Thomes, Stoney and Elder creeks riparian and flood plain conditions inventory	$150,000	$150,000
Paynes Creek watershed assessment	$75,000	$75,000
Antelope Creeks watershed assessment	$75,000	$75,000
Cottonwood Creek riparian habitat inventory, ph1	$100,000	$100,000
Mill Creek riparian habitat identification and mapping, ph 1	$100,000	$100,000

Project	FY05 AFRP Funding	Total Estimated AFRP Project Cost
Central Valley Wide: Working at a Watershed Level	$50,000	$50,000
Fish ladder improvements, Beale Air Force Base (Dry Creek)	$150,000	$150,000
Steelhead spawning side-channel improvements (American River)	$120,000	$570,000
Pilot studies of Alaska Weirs/Vaki River Watchers for Merced rivers	$150,000	$150,000
Development of a strategic plan to restore fish habitat and passage in the northern Yolo Bypass	$119,000	$119,000
Fish population model upgrade (San Joaquin River)	$200,000	$200,000
Riparian and floodplain habitat modeling and restoration (Feather River)	$700,000	$700,000
Predation Study (Stanislaus River)	$250,000	$600,000
Assess existing flow and temperature conditions for adult and juvenile salmonids between Woodbridge Dam and the Delta (Molelumne River)	$150,000	$450,000
Survival evaluation (analysis of survival studies - assess survival test info to date-San Joaquin River)	$50,000	$150,000
Subtotals	**$4,097,600**	**$6,397,600**
Total Estimated Project Costs	**$6,686,970**	**$10,921,970**

B. Schedule and Deliverables

#	Task	Dates		Deliverable
		Start	Complete	
1	**Program management**	**10/01/04**	**09/30/05**	**Provides a revised FY2003 Annual Work Plan (AWP), a draft FY2004 AWP; and final grants, cooperative agreements, and contracts for projects supported by the AFRP, identifying partners and cofunding, selecting and funding peer-reviewed restoration projects.**
1.1	Program management (AFRP/STFWO)	10/01/04	09/30/05	Program manager is responsible for AFRP performance and CBDA integration. Assistant Program Manager reports to Program Manager and implements the AFRP (see 1 above).
1.2	Program management (USBR/AFRP)	10/01/04	09/30/05	Provides liaison between USBR and AFRP
1.3	Program implementation (AFRP/STFWO)	10/01/04	09/30/05	Habitat Restoration Coordinators (HRC) prioritize projects, develop partnerships, develop proposals, and manage project deadlines and deliverables. Assistant HRC's support all HRC work.
1.4	Program implementation (AFRP/RBFWO)	10/01/04	09/30/05	Provides grants, cooperative agreements, and contracts for USBR-led projects (see 1.3 above).
1.5	Management/Administrative support (SFWO)	10/01/04	09/30/05	Provides support in external affairs, administration and interagency program coordination to AFRP.
2.0	**Technical support**	**10/01/04**	**09/30/05**	**Provides instream studies (e.g., IFIM); NEPA, FWCA, ESA and other compliance-related documentation; and real estate appraisal reviews for AFRP-led projects.**
2.1	Sacramento FWO	10/01/04	09/30/05	Performs instream studies and provides NEPA, FWCA, ESA, and other compliance-related documentation as required for each of the projects supported by the program.

#	Task	Dates		Deliverable
		Start	Complete	
2.1.1	Instream flow evaluations (AFRP/SFWO)	10/01/04	09/30/05	Conducts instream flow and spawning habitat studies, and prepares annual reports. Instream flow requirements for CVPIA are covered under a separate program 3406(b)(1)(B).
2.1.2	Environmental compliance (USFWS/SFWO/HCD)	10/01/04	09/30/05	Provides NEPA, FWCA and other compliance-related documentation as required for each of the projects supported by the program.
2.1.3	Endangered Species Act compliance (USFWS/SFWO/ESP)	10/01/04	09/30/05	Provides Biological Opinion and Biological Assessment processes and documentation for AFRP-led projects.
2.2	California Nevada Office – Realty (USFWS/CNO-Realty)	10/01/04	09/30/05	Provides realty support services, appraisals, escrow and contract review management to the AFRP.
3.0	**Project funding and implementation**	**10/01/04**	**09/30/05**	**Project funding and implementation.** As part of efforts to better integrate implementation of CVPIA and CBDA programs consistent with the CBDA Implementation Memorandum of Understanding, the AFRP expects to prioritize future projects fully considering the CBDA ERP Proposal Solicitation Process (PSP). Projects will be identified for funding based on their contribution to the AFRP and CBDA program objectives, and their consistency with the priorities listed in Section III, Program Objectives.–Some of the specific projects may be a continuation of previously funded projects, others will be new to the program. Project prioritization will also be closely coordinated with other CVPIA related program activities and with the USBR's Central Valley Project Conservation Program.

C. Summary of Program Costs and Funding Sources

#	Task	Total Costs	Funding Sources
1.0	**Program Management**		
1.1	Program Management- (USFWS/STFWO)	80,217	80,217
1.2	Program Management- (USBR/AFRP)	10,000	10,000
1.3	Program implementation-(AFRP/STFWO)	1,072,420	1,072,420
1.4	Program implementation-AFRP-RBFWO)	364,534	364,534
1.6	Management/Administrative support (SFWO)	316,986	316,986
	Subtotal	**1,844,156**	**1,844,156**
2.0	**Environmental Documentation and appraisal review and technical support**		
2.1	Sacramento FWO		
2.1.1	Instream flow evaluations (AFRP/SFWO)	395,725	395,725
2.1.2	Environmental compliance (USFWS/SFWO)	158,493	158,493
2.1.3	Endangered Species Act compliance (USFWS/SFWO)	79,246	79,246
2.2	California Nevada Office – Realty (USFWS/CNO-Realty)	39,623	39,623
	Subtotal	**673,088**	**673,088**
	Total Support & Operations	**2,517,244**	**2,517,244**
3.0	**Project Funding and Implementation**	**2,673,756**	**2,673,756**
	Total Program	**5,191,000**	**5,191,000**

D. AFRP Program Budget.

#	Task	FTEs	Operations	Overhead Costs	Total Costs
1.0	**Program Management**				
1.1	Program Management- (USFWS/STFWO)	0.32	65,217	15,000	80,217
1.2	Program Management- (USBR/AFRP)	0.05	10,000	0	10,000
1.3	Program implementation-(AFRP/STFWO)	4.32	871,886	200,534	1,072,420
1.4	Program implementation-AFRP-RBFWO)	2.30	296,369	68,165	364,534
1.5	Management/Administrative support (SFWO)	2.00	257,712	59,274	316,986
	Subtotal	**8.99**	**1,501,184**	**342,972**	**1,844,156**

#	Task	FTEs	Operations	Overhead Costs	Total Costs
2.0	**Environmental Documentation and appraisal review and technical support**				
2.1	Sacramento FWO				
2.1.1	Instream flow evaluations (AFRP/SFWO)	2.50	324,365	71,360	395,725
2.1.2	Environmental compliance (USFWS/SFWO)	1.00	128,856	29,637	158,493
2.1.3	Endangered Species Act compliance (USFWS/SFWO)	0.50	64,428	14,818	79,246
2.2	California Nevada Office – Realty (USFWS/CNO-Realty)	0.25	32,214	7,409	39,623
	Subtotal	**4.25**	**549,863**	**123,225**	**673,088**
	Total Support & Operations	**13.24**	**2,051,047**	**466,197**	**2,517,244**
3.0	Project Funding and Implementation		**2,522,411**	**151,345**	**2,673,756**
	Total Program	**13.24**	**4,573,459**	**617,542**	**5,191,000**

Explanatory Notes: Costs for each of the primary tasks shown in bold show the total for each of the sub-tasks shown below the primary task. Contract and Administrative costs are estimates. Actual costs based on projects identified in coordination with the Bay-Delta Program ERP Proposal Solicitation and review process and project management costs.

E. CVPIA Program Budget - Additional Funding Needs.

Additional projects which meet the above priorities will be implemented as funding allows. Priority will be given to activities that promote natural channel and riparian habitat values and natural processes, such as those affecting stream flow, water temperature, water quality and riparian areas, and to activities that affect emigration or access to streams, such as sites of entrainment into diversions and migration barriers.

VII. Future Years Commitments/Actions

Some actions planned for FY2005 may require maintenance and/or monitoring activities in future years. This is particularly relevant for any proposed restoration projects or any multi-year survey requests. Property acquisitions (fee title or conservation easements) may require future funding for the development and/or implementation of management activities. Continuing activities should contribute towards the recovery of federal and state listed fish species and their habitats. Provided that funding levels could increase to meet the need, the AFRP could spend about $11 million over the next three-year period (FY2005-07) on peer-reviewed habitat

restoration projects and watershed research. Major cuts in out-year AFRP budgets, as occurred in FY 2004, could significantly impact ongoing projects and investments.

For planning purposes, Table 3 identifies future AFRP watershed restoration projects that could be developed, implemented and funded with appropriate funding levels from FY 2005 through FY2007.

Table 3. AFRP project planning list showing prioritized ongoing and new projects and estimated costs through FY 2007.

Project	FY05 AFRP Funding	FY06 AFRP Funding	FY07 AFRP Funding	Targeted Cofunding	Total AFRP Cost	Total Estimated Project Cost
Ongoing Projects						
Test and Demonstrate a Portable Alaskan Weir to Count and Characterize Runs of Anadromous Salmonids in the Stanislaus River	$100,000	$100,000	$100,000	0	$300,000	$300,000
VAKI Monitoring and Analysis (3-year study FY05-07) (Yuba River)	$65,561	0	0	0	$65,561	$65,561
Continuation Lower Calaveras salmonid life history limiting factor analysis	$180,000	$30,000	0	0	$210,000	$210,000
Amendment request for the sex-reversal study (UCD)	$117,000	0	0	0	$117,000	$117,000
Iron Canyon Fish Ladder (Big Chico Creek)	$250,000	$250,000	$200,000	$700,000	$700,000	$1,400,000
Modify life history/eval in lower Yuba River to include tag recovery and analysis of wild stock	$30,000	0	0	0	$30,000	$30,000
Continue improving passage of salmonids at diversion dams and barriers (Cosumnes River)	$125,000	0	0	0	$125,000	$125,000
Mokelumne River spawning habitat improvement project	$30,000	0	0	0	$30,000	$30,000
Lover's Leap & Knights Ferry Floodplain & Side-channel Restoration outreach (Stanislaus River)	$150,000	0	0	0	$150,000	$150,000
Restoration plan development and outreach (Stanislaus River)	$100,000	$100,000	0	$100,000	$200,000	$300,000
MJ Ruddy revegetation and monitoring (Tuolumne River)	$715,000	$715,000	0	0	$1,430,000	$1,430,000
Wing dam gravel purchase and	$75,000	$75,000	0	0	$150,000	$150,000

Project	FY05 AFRP Funding	FY06 AFRP Funding	FY07 AFRP Funding	Targeted Cofunding	Total AFRP Cost	Total Estimated Project Cost
screening (Merced River)						
SHIRA-based analysis, Phase II (Yuba River)	$161,809	0	0	0	$161,809	$161,809
Sutter bypass eastside, Mod. 3 (MOA/Restoration Plan-Butte Creek)	$125,000	0	0	0	$125,000	$125,000
Butte and Big Chico creeks salmon life history	$165,000	$165,000	0	$200,000	$330,000	$530,000
Continue to assist locally led efforts to facilitate coordination of the Butte Sink/Sutter Bypass stakeholders	$100,000	$100,000	$100,000	$100,000	$300,000	$400,000
Juvenile salmon outmigration monitoring at Caswell	$100,000	0	0	0	$100,000	$100,000
Subotals	**$2,589,370**	**$1,535,000**	**$400,000**	**$1,100,000**	**$4,524,370**	**$5,624,370**

Project	FY05 AFRP Funding	FY06 AFRP Funding	FY07 AFRP Funding	Targeted Cofunding	Total AFRP Cost	Total Estimated Project Cost
New Projects						
Mill Creek fish passage study	$150,000	$150,000	0	0	$300,000	$300,000
Stream habitat restoration on the Sierra College campus (Gregg Bates) (Dry Creek)	$100,000	0	0	$10,000	$100,000	$110,000
Secret Ravine Channel Habitat Restoration (Dry Creek)	$120,000	0	0	$10,000	$120,000	$130,000
Hatchery Proportion Study	$100,000	$100,000	$100,000	0	$300,000	$300,000
Dos Rios conservation easement (add-on to Two-Mile Bar project-Tuolumne River)	$50,000	$50,000	0	$2,450,000	$100,000	$2,550,000
Life-stage contribution study (Merced & Tuolumne expansion)	$250,000	$175,000	$175,000	0	$600,000	$600,000
American River steelhead life history	$100,000	0	0	0	$100,000	$100,000
Mokelumne River side-channel restoration	$53,600	0	0	0	$53,600	$53,600
Cottonwood Creek geomorphological analysis	$100,000	$0	0	0	$100,000	$100,000
One-mile Dam modification and gravel supplementation	$175,000	$0	0	$250,000	$175,000	425000

Project	FY05 AFRP Funding	FY06 AFRP Funding	FY07 AFRP Funding	Targeted Cofunding	Total AFRP Cost	Total Estimated Project Cost
project- City of Chico (Big Chico Creek)						
Lower Bear River existing conditions study	$100,000		0	0	$100,000	$100,000
Antelope Creek fish passage project	$60,000	$0	0	0	$60,000	$60,000
Deer Creek (upper) erosion reduction	$50,000	$0	0	0	$50,000	$50,000
Life-stage contribution study (Stanislaus River)	$250,000	$175,000	$175,000	0	$600,000	$600,000
Thomes, Stoney and Elder creeks riparian and flood plain conditions inventory	$150,000	$0	0	0	$150,000	$150,000
Paynes Creek watershed assessment	$75,000	$0	0	0	$75,000	$75,000
Antelope Creeks watershed assessment	$75,000	$0	0	0	$75,000	$75,000
Cottonwood Creek riparian habitat inventory, ph1	$100,000	$0	0	0	$100,000	$100,000
Mill Creek riparian habitat identification & mapping, ph 1	$100,000	$0	0	0	$100,000	$100,000
Central Valley Wide: Working at a Watershed Level	$50,000	0	0	0	$50,000	$50,000
Fish ladder improvements, Beale Air Force Base (Dry Creek)	$150,000	0	00	0	$150,000	$150,000
Steelhead spawning side-channel improvements (American River)	$120,000	$225,000	$225,000	$30,000	$570,000	$600,000
Pilot studies of Alaska Weirs/Vaki River Watchers for Merced rivers	$150,000	0	0	0	$150,000	$150,000
Development of a strategic plan to restore fish habitat and passage in the northern Yolo Bypass	$119,000	0	0	$59,500	$119,000	$178,000
Fish population model upgrade (San Joaquin River)	$200,000	0	0	0	$200,000	$200,000
Riparian and floodplain habitat modeling and restoration (Feather River)	$700,000	0	0	0	$700,000	$700,000
Predation Study (Stanislaus River)	$250,000	$175,000	$175,000	0	$600,000	$600,000
Assess existing flow and temperature conditions for	$150,000	$150,000	$150,000	0	$450,000	$450,000

Project	FY05 AFRP Funding	FY06 AFRP Funding	FY07 AFRP Funding	Targeted Cofunding	Total AFRP Cost	Total Estimated Project Cost
adult and juvenile salmonids between Woodbridge Dam and the Delta (Molelumne River)						
Survival evaluation (analysis of survival studies - assess survival test info to date-San Joaquin River)	$50,000	$50,000	$50,000	0	$150,000	$150,000
Subtotals	**$4,097,600**	**$1,250,000**	**$1,050,000**	**$2,809,500**	**$6,397,600**	**$9,206,600**
Total Project Costs	**$6,686,970**	**$2,785,000**	**$1,450,000**	**$3,909,500**	**$10,921,970**	**$,14,830,970**

The following AFRP Restoration and Research Gap Analysis is presented with identified new projects (emboldened) and incorporated into the identified "Project Target" categories. These identified projects are depicted in the Tables 1 and 2, the AFRP project planning lists. The CBDP is integrated into AFRP's restoration project "Gap Analysis" which will ensure coordination of anadromous fish restoration efforts and needs. Emboldened project titles depicted in the following AFRP Restoration Research Gap Analysis are those new projects that are identified in Table 3 above.

AFRP Restoration and Research Gap Analysis

Central Valley-wide

Objective 1: Improve understanding of salmon and steelhead life history requirements.
Project gap: Improve understanding of salmon and steelhead life history and population structures in Central Valley streams.
Project target: 1) **Hatchery Proportion Study,** 2) Central Valley Steelhead Population Structure Evaluation (AFRP); 3) assessment of Life-history Characteristics and Genetic Composition of *Oncorhynchus mykiss* project (CBDA); 4) Steelhead Workshop; and 5) sonic tagging and tracking of yearling *Oncorhynchus mykiss*.

Objective 2: Expand the distribution of steelhead in the Central Valley.
Project gap: Survey Central Valley watersheds to identify additional steelhead habitat.
Project target: Identify streams without steelhead targets to potentially support steelhead.

Objective 3: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Identify actions to reduce predation on juvenile salmonids.
Project target: 1) Conduct the San Joaquin Basin Chinook Salmon Smolt Predation Workshop; and 2) effects of Predation Dynamics on Outmigrating Salmon in the Delta (CBDA).

Objective 4: Provide education and outreach.
Project gap: Expand and support education of resource management professionals.
Project target: 1) Conduct the **Working at a Watershed Level training course** for project partners and stakeholders (CBDA); and 2) Adaptive Management Forum (AMF) Planning team response to AMF review panel reports.

Objective 5: Acquire and restore anadromous fish habitat.
Project gap: Evaluate the feasibility of actions to restore and improve small tributaries.
Project target: Fund small tributary restoration projects as available.

Objective 6: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Evaluate effects of non-native species on anadromous fish.
Project target: Study gut contents of non-native species to determine if they are competing with or predating upon anadromous fish.

Objective 7: Provide education and outreach.
Project gap: Report updated natural production estimates of anadromous fish to resource managers and stakeholders.
Project target: 1) Develop a database on natural production with graphic interface linked to the AFRP website (AFRP); 2) Draft CAMP report documenting flow, escapement and production; 3) Analyze flow and production/escapement for Central Valley tributaries; and 4) Conduct a study to document actual hatchery contribution to natural production (escapement).

Upper mainstem Sacramento River and tributaries

Upper mainstem Sacramento River

Objective 1: Acquire and restore anadromous fish habitat.
Project gap: Repair erosion problems and restore available floodplain habitat in the upper Sacramento River meander corridor.
Project target: Remove levees and restore floodplain function and restore pits and mounds resulting from past gravel mining operation (AFRP).

Objective 2: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Reduce loss of Chinook and steelhead juveniles due to unscreened diversions.
Project target: 1) **Develop a strategic plan to restore fish habitat and passage in the northern Yolo Bypass**, 2) Screen City of Redding water supply pumps to prevent endangered winter-run Chinook entrainment.

Objective 3: Conduct watershed management planning.
Project gap: Lack of collated, comprehensive watershed information.
Project target: Develop upper mainstem Sacramento River baseline of knowledge with regards to small tributaries' role: (e.g., Churn and Stillwater Creeks, Shasta West watersheds, Bear Creek); complete watershed assessments and/or initiate watershed management planning; gather baseline fisheries information.

Objective 4: Improve understanding of life history requirements.
Project gap: Develop an understanding of salmon and steelhead life history and population structures in Mill, Deer, Cottonwood, and Cow creeks.
Project target: Continue escapement evaluations in Mill, Deer, Cottonwood and Cow Creeks.

Cow Creek

Objective 1: Enhance and ensure adequate flow.
Project gap: Monitor stream flow and temperature to relate to abundance and migration timing of anadromous salmonids.
Project target: 1) Install water temperature recorders at select locations (CBDA); 2) monitor adult salmon and steelhead abundance; 3) collect flow data from existing gages or install new real-time flow gages; and 4) develop recommendations for minimum instream flow based on temperature needs and timing of salmon and steelhead migrations.

Objective 2: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Construct fish screens and ladders, and conduct feasibility analyses for screening and laddering other agriculture water diversions.
Project target: conduct feasibility analyses for screening and laddering five agriculture water diversions (pilot projects).

Objective 3: Conduct watershed management planning.
Project gap: Watershed management plan.
Project target: Cow Creek Watershed Management Plan (AFRP).

Objective 4: Improve understanding of life history requirements.
Project gap: Conduct fish population investigations.
Project target: Monitor fish populations.

Battle Creek

Objective 1: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Reduce entrainment by screening diversions and prevent entrainment of anadromous fish.

Project target: 1) Screen intakes to Coleman National Fish Hatchery; and 2) prevent "take"of listed fish species by constructing a picket weir in PG&E's Hydropower Tailrace (PG&E).

Objective 2: Improve understanding of life history requirements.
Project gap: Conduct fish population, health, and habitat evaluations.
Project target: 1) Evaluate juvenile Chinook and steelhead life history; 2) conduct spawner surveys for steelhead; 3) continue rotary screw trapping for juvenile life history, estimate spawner success, and estimate steelhead population abundance; and 4) integrate restoration efforts with hatchery and harvest management (CBDA).

Objective 3: Conduct watershed management planning.
Project gap: Watershed management Assessment.
Project target: Battle Creek Watershed Assessment (MWD).

Cottonwood Creek

Objective 1: Enhance and ensure adequate flow.
Project gap: Monitor stream flow and temperature and relate to abundance and timing of anadromous salmonids.
Project target: 1) Collect flow and temperature data from existing gages or newly installed real-time gages; 2) determine upstream geographic distribution and timing of adult Chinook salmon; 3) determine timing and abundance of downstream migrating juvenile salmonids; and 4) develop recommendations for minimum instream flow based on temperature needs and timing of salmon and steelhead migrations (CBDA—Strategic Plan).

Objective 2: Acquire and restore anadromous fish habitat.
Project gap: Lack of information on the extent and quality of riparian habitat in the watershed.
Project target: 1) **Cottonwood Creek riparian habitat inventory, ph1**, and 2) Develop riparian easements, changes in land management, and/or acquisitions in partnership with local watershed groups, landowners, stakeholders and state and federal conservation agencies.

Objective 3: Conduct watershed management planning.
Project gap: Support development of a watershed management plan.
Project target: 1) **Cottonwood Creek geomorphologic analysis**; and 2) Develop a Cottonwood Creek Watershed Management Strategy (CBDA).

Objective 4: Improve understanding of life history requirements.
Project gap: Estimate juvenile salmonid production.
Project target: Monitor fish populations.

Objective 5: Provide education and outreach.
Project gap: Promote community support for the local Cottonwood Creek watershed group.
Project target: Watershed group educational outreach and support.

Bear Creek

Objective 1: Provide education and outreach.
Project gap: Promote community support for a local Bear Creek watershed group.
Project target: 1) Conduct a water quality and fish population evaluation program; 2) conduct training session for residents involved in surveys; 3) conduct fall 2004 redd survey; and 4) provide educational workshops for kids and adults to address watershed issues.

Objective 2: Conduct watershed management planning.
Project gap: Support development of a watershed assessment.
Project target: Develop a Bear Creek Watershed Assessment (CBDA/SWRCB).

Antelope Creek

Objective 1: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Improve spring-run Chinook salmon and steelhead passage.
Project target: **Antelope Creek fish passage project-** Implement the Edwards Dam Ladder construction project. (AFRP).

Objective 2: Conduct watershed management planning.
Project gap: Support development of a watershed assessment.
Project target: Develop a Antelope Creeks Watershed Assessment.

Mill Creek

Objective 1: Acquire and restore anadromous fish habitat.
Project gap: Assess quality of riparian habitat and acquire and preserve riparian conservation easements and fee properties.
Project target: 1**) Mill Creek riparian habitat identification and mapping, ph 1**; and 2) Develop riparian easements, changes in land management, and/or acquisitions in partnership with local watershed groups, landowners, stakeholders and state and federal conservation agencies.

Objective 2: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Acquire additional instream water supplies for enhanced anadromous fish habitat and life history requirements.
Project target: Work with state and federal water acquisition programs to develop dedicated instream water (CBDA-EWP).

Objective 3: Reduce adverse impacts to anadromous fish production from fine sediments.
Project gap: Develop engineering solutions to erosion problems in the Mill Creek watershed.
Project target: 1) Reduce stream down-cutting and bank erosion; 2) build sediment retention structures; and 3) transplant native vegetation to fortify stream banks.

Objective 4: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Develop spring-run Chinook salmon and steelhead passage information in Mill Creek.
Project target: Implement the **Mill Creek Anadromous Fish Passage Study** (AFRP).

Objective 5: Provide education and outreach.
Project gap: Support the Mill Creek Conservancy (MCC).
Project target: Continue educational outreach and support and assist MCC in watershed management planning activities.

Deer Creek

Objective 1: Acquire and restore anadromous fish habitat.
Project gap: Assess where to install bank stabilizing devices and revegetate eroding banks.
Project target: 1) Lower Deer Creek Restoration and Flood Management Feasibility Study and Conceptual Design (CBDA); 2) Deer Creek (upper) erosion reduction project; 3) reduce bank sloughing and stream down- cutting; 4) build sediment retention structures; and 5) transplant native vegetation to fortify stream banks.

Objective 2: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Improve spring-run Chinook salmon and steelhead passage information in Deer Creek.
Project target: 1) Carryout a **Deer Creek (upper) erosion reduction** project, 2) Permit and construct a fish ladder and new apron on the Cone-Kimball Diversion (AFRP). 3) Jump pool enhancement and rock installation, Stanford -Vina Dam Fish Ladder (AFRP); 4) Design and implement a Deer Creek Anadromous Fish passage study.

Objective 3: Provide education and outreach.
Project gap: Support the Deer Creek Watershed Conservancy (DCWC).
Project target: Continue educational outreach and support and assist DCWC in watershed management planning activities.

Paynes Creek

Objective 1: Conduct watershed management planning.
Project gap: Support development of a watershed assessment.
Project target: **Develop a Paynes Creek Watershed Assessment**

Thomes, Stony, and Elder creeks

Objective 1: Conduct watershed management planning.
Project gap: Support development of a watershed assessment.
Project target: **Thomes, Stony and Elder creeks riparian and flood plain conditions inventory**.

Butte Creek

Objective 1: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Construct fish passage and protection facilities.
Project target: 1) Construct White Mallard Dam and associated diversion- phase III (CBDA); 2) Lower Butte Creek Project: Sutter Bypass - Willow Slough Weir Fish Passage Project - Preliminary Engineering Investigation; and 3) Butte Sink Water Control Structure Modifications - Phase III Construction (AFRP).

Objective 2: Improve understanding of life history requirements.
Project gap: Understand anadromous fish salmonid life history characteristics.
Project target: Continue to evaluate the juvenile life history of spring-run Chinook salmon in Butte Creek (AFRP and CBDA).

Objective 3: Enhance and ensure adequate flow.
Project gap: Develop flow recommendations and obtain additional flows for anadromous fish passage.
Project target: 1) Facilitate finalizing the change in use of the Upper Butte Basin Wildlife Area water right from agriculture to in stream use; and 2) purchase additional permanent water rights from willing sellers for in stream use.

Objective 4: Enhance and ensure adequate flow.
Project gap: Install and maintain real-time flow metering; monitor minimum 45 cfs of dedicated instream fish water throughout Butte Creek.

Project target: Add or change locations of certain flow gages in Sutter Bypass (AFRP).

Objective 5: Acquire and restore anadromous fish habitat.
Project gap: Conduct riparian restoration and repair erosion problems.
Project target: Acquire riparian properties from willing sellers.

Big Chico Creek

Objective 1: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Construct fish passage and protection facilities.
Project target: 1) Implement the Iron Canyon Fish Passage Project (AFRP).

Objective 2: Acquire and restore anadromous fish habitat.
Project gap: Habitat restoration.
Project target: Conduct Big Chico Creek habitat restoration and conservation easements.

Objective 3: Acquire and restore anadromous fish habitat.
Project gap: Spawning gravel addition.
Project target: 1**) One-mile Dam modification and gravel supplementation project- City of Chico**, and 2) add spawning gravels at Five-Mile Diversion.

Objective 4: Acquire and restore anadromous fish habitat.
Project gap: Conduct riparian restoration and repair erosion problems.
Project target: Develop riparian easements, changes in land management, and/or acquisitions in partnership with local watershed groups, landowners, stakeholders and state and federal conservation agencies.

Objective 5: Improve understanding of life history requirements.
Project gap: Conduct anadromous salmonid life history study.
Project target**:** Increase numbers of CWT juveniles, compensate for State funding cuts, and fund through 2005.

Lower Sacramento River, Delta Tributaries, and Delta

Feather River

Objective 1: Enhance and ensure adequate flow.
Project gap: Develop flow recommendations and obtain additional flows for anadromous salmonid passage; develop and evaluate corrective measures to address juvenile and adult stranding in side pools.

Project target: 1) Develop through the Oroville Dam Federal Energy Regulatory Commission (FERC) negotiated re-licensing study plan; and 2) implement **riparian and floodplain habitat modeling and restoration**.

Objective 2: Enhance and ensure adequate water temperature.
Project gap: Develop a temperature model to understand the impacts of temperature on anadromous fishes.
Project target: Develop through the Oroville Dam FERC negotiated relicensing study plan.

Objective 3: Ensure genetic integrity.
Project gap: Develop a plan to promote isolation of spring- and fall-run Chinook salmon spawners.
Project target: 1) Develop through the Oroville Dam FERC negotiated relicensing study plan; and 2) implement spring-and fall-run genetic analysis study.

Objective 4: Enhance and ensure adequate flow.
Project gap: Develop flow recommendations and obtain additional flows for sturgeon and American shad passage.
Project target: Develop through the Oroville Dam FERC negotiated relicensing study plan.

Yuba River

Objective 1: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Modify and maintain appropriate flows through the Daguerre Point Dam fish ladders.
Project target: 1) Collaboratively design the Daguerre Point Dam fish ladder passage engineering and design of preferred alternative.

Objective 2: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Construct and improve screen and bypasses at South Yuba-Brophy Headworks.
Project target: Develop fish screen feasibility and interim fish protection measures for diversion facilities in collaboration with Yuba County Water Agency (YCWA) and South Yuba and Brophy Water Districts.
Objective 3: Enhance and ensure adequate water flow and temperature.
Project gap: Acquire and maintain flows to provide proper flow regime and temperature for all life stages of salmonids.
Project target: 1) Carry out Yuba River RD-1644 settlement process; and 2) establish environmental Water Accounts (CBDA and CVPIA).

Objective 4: Improve spawning habitat to increase salmonid natural production.
Project gap: Implement gravel additions in upper reaches of the Yuba River.

Project target: 1) Conduct gravel additions above and below Narrows Pool (US Army Corps of Engineers mitigation); and 2) SHIRA-based River Analysis, Phase II (AFRP).

Objective 5: Acquire and or restore habitat.
Project gap: Acquire and preserve riparian conservation easements and fee properties.
Project target: 1) Develop projects from the Yuba River Technical Working Group Implementation Plan; 2) spring-run Chinook salmon habitat feasibility study; and 3) riparian and floodplain habitat restoration feasibility study.

Objective 6: Enhance and ensure adequate water flow and temperature.
Project gap: Develop a temperature model for the lower Yuba River and associated tributaries below Englebright Dam.
Project target: Install flow/temperature gauges in deer and Dry creeks and waterways associated with inflow or outflow in the Yuba (e.g., Goldfields waterways and diversion returns).

Bear River

Objective 1: Enhance and ensure adequate flow.
Project gap: Develop flow recommendations and obtain additional flows in coordination with the Nevada County Resource Conservation District and area stakeholders in order to improve anadromous fish passage.
Project target: Develop a Bear River Watershed Plan (CBDA).

Objective 2: Provide education and outreach.
Project gap: Promote community support for a local Bear River watershed group.
Project target: 1) **Lower Bear River existing conditions study**, 2) Develop a Lower Bear River Watershed Plan with stakeholders (CBDA).

Objective 3: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Conduct fish barrier evaluation studies and recommend solutions for improvement, and screen water diversions.
Project target: Conduct a SHIRA Analysis of the Lower Bear River.

Dry Creek (tributary to Bear River)

Objective 1: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Construct fish screens and ladders, and conduct feasibility analyses for screening and laddering other agriculture water diversions.

Project target: 1) **Fish ladder improvements, Beale Air Force Base**, 2) conduct feasibility analyses for screening and laddering five agriculture water diversions (pilot projects).

American River

Objective 1: Enhance and ensure adequate flow.
Project gap: Evaluate, provide recommendations, and participate in interagency activities to develop proper flow regimes in the American River.
Project target: 1) Study *Oncorhynchus mykiss* (steelhead) movement in response to changes in flow.

Objective 2: Enhance steelhead spawning.
Project Gap: Support and cooperate in inter-agency efforts towards anadromous fish habitat improvement.
Project target: 1) **Steelhead spawning side-channel improvements,** and 2) **American River steelhead life history**

Dry Creek (tributary to American River)

Objective 1: Acquire and restore anadromous fish habitat.
Project gap: Habitat restoration.
Project target: 1) **Stream habitat restoration on the Sierra College campus (Gregg Bates),** and 2) **Secret Ravine Channel Habitat Restoration**

Mokelumne River

Objective 1: Enhance and ensure adequate flow.
Project gap: Acquire additional flows from willing sellers to enhance steelhead survival.
Project target: 1) Assess which life stages of steelhead and Chinook salmon are most limited by current flows and temperatures and identify water requirements not currently available; and 2) negotiate water right purchases and/or increase flow releases from Camanche Dam.

Objective 2: Acquire and restore anadromous fish habitat.
Project gap: Determine optimal design for gravel replenishment in Central Valley rivers and continue enhancing spawning habitat.
Project target: 1) Implement the Demonstration Project to Rehabilitating Salmonid Spawning Habitat (AFRP); and 2) Continuation of Mokelumne River Spawning Habitat Improvement (AFRP).

Objective 3: Enhance and ensure adequate water quality.
Project gap: Monitor flow releases from Camanche Dam to assess effects on Downstream salmonid migrants.
Project target: 1) Determine juvenile steelhead and Chinook salmon survival for different flows and temperatures in several water-year types and recommend operational changes 2) **assess existing flow and temperature conditions for adult and juvenile salmonids between Woodbridge Dam and the Delta**

Objective 4: Acquire and restore anadromous fish habitat.
Project gap: Negotiate and acquire riparian easements and improve riparian habitats.
Project target: 1) **Mokelumne River side-channel restoration**, 2) Lower Mokelumne River salmonid rearing habitat restoration project; and 3) acquire easements to protect riparian habitat.

Cosumnes River

Objective 1: Enhance and ensure adequate flow.
Project gap: Assess upstream and downstream flow needs for fall-run Chinook salmon.
Project target: 1) Continuation of Flow Requirement and Water Acquisition Feasibility for fall-run Chinook Salmon in the Cosumnes River (AFRP); 2) improve flows for all life stages of fall-run Chinook salmon; and 3) negotiate agreements with landowners, state, local and federal agencies to control water diversions and groundwater pumping.

Objective 2: Acquire and restore anadromous fish habitat.
Project gap: Acquire easements and purchase land and restore riparian habitat and fluvial processes; monitor permit requests to modify riparian habitats.
Project target: 1) Restore riparian zones to improve salmonid spawning and rearing habitats; 2) acquire lands and easements to improve riparian habitat; and 3) prevent further use of rip-rap to stabilize river banks.

Objective 3: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Remove fish barriers and assess relations between flow and egg-juvenile survival and fry-juvenile mortality due to predation
Project target: 1) Continue improving passage of salmonids at diversion dams and barriers (AFRP and USBR); 2) determine the need for a predator control plan to reduce fry and juvenile salmon mortality by non-native fishes (AFRP); and 3) determine survival of juvenile Chinook salmon in different water-year types.

Objective 4: Acquire and restore anadromous fish habitat.
Project gap: Assess the quality of salmonid spawning and rearing habitats below and above Granlees diversion dam.
Project target: 1) Determine the carrying capacity of current and potential spawning and rearing habitat for Chinook salmon and steelhead; 2) restore spawning and rearing habitat for Chinook salmon; and 3) assess the feasibility to reintroduce steelhead trout.

Calaveras River

Objective 1: Enhance and ensure adequate flow.
Project gap: Determine flow requirements to support anadromous runs of steelhead and Chinook salmon below New Hogan Dam.
Project target: 1) Implement the Calaveras River Salmonid Passage Study (AFRP); and 2) negotiate agreements with landowners, SEWD, CCWD, and federal and state agencies to provide additional instream flows or purchase water rights.

Objective 2: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Evaluate best upstream and downstream migration corridor for salmonids between the Delta and Bellota Weir; Restore passage to spawning grounds above Bellota Weir and downstream passage to the Delta for steelhead and fall- and spring-run Chinook salmon.
Project target: 1) Continue monitoring passage through the Retrofitted Bellota Weir fish ladder and monitor upstream and downstream salmonid passage and stranding; and 2) develop a feasibility study for a permanent upstream and downstream passage to salmonids between the Delta and Bellota Weir.

Objective 3: Improve understanding of life history requirements.
Project gap: Determine steelhead and Chinook salmon limiting factors and carrying capacity.
Project target: 1) Continue Implementing the Lower Calaveras River Salmonid Life History Limiting Factor Analysis (AFRP) to assess flow requirements for anadromous salmonids; and 2) Phase I restoration plan for anadromous fish in the Calaveras River.

Objective 4: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Assess existing fish screen design efficiency and build screens compatible with fish rearing and upstream/downstream fish passage.
Project target: Coordinate with SEWD and DWR to accomplish Project Targets 1 and 2 under Objective 2.

Delta

Objective 1: Enhance and ensure adequate environmental water quality.
Project gap: Maintain a 6 mg/L dissolved oxygen standard during September through November in the San Joaquin River between Turner Cut and Stockton.
Project target: 1) Conduct restoration planning for watersheds impacting low dissolved oxygen conditions in the Lower San Joaquin River near Stockton; 2) implement Adaptive Real-Time Forecasting and Sustainable Management of Dissolved Oxygen in the San Joaquin River and Stockton Deep Water Ship Channel (CBDA); 3) implement the Lower San Joaquin River Flow Supplementation (VAMP and EWP); and 4) operate the Fall Head of Old River Barrier and DWR water quality testing.

San Joaquin Basin

San Joaquin Basin-wide

Objective 1: Improve understanding of life history requirements.
Project gap: Evaluation and distribution of salmonid population data.
Project target: 1) Provide assistance to CDFG (La Grange) to acquire and summarize existing data; 2) conduct basin-wide age determination work (AFRP); and 3) synthesize the four existing fish population models into a single best fit model.

Objective 2: Reduce mortality to outmigrating juvenile salmonids.
Project gap: Identify sources and magnitude of mortality to outmigrating juvenile salmonids.
Project target: 1) Develop comprehensive study of existing basin-wide CWT data to quantify juvenile survival; 2) cumulative assessment of basin-wide rotary screw trapping data; and 3) conduct additional structured CWT releases to evaluate San Joaquin Basin survival within and between tributaries and in the mainstem San Joaquin River, 4) **Survival evaluation (analysis of survival studies - assess survival test info to date).**

Objective 3 Acquire and restore anadromous fish habitat.
Project gap: Quantify use of natural and restored/created spawning and rearing habitat with the basin.
Project target: 1) Conduct more detailed redd surveys within the three tributaries; 2) develop a long-term aggregate source for San Joaquin tributary projects; 3) evaluate the potential use of dredger tailings on CDFG Merced River Ranch property; (AFRP); 4) implement the Dredger Tailings Adaptive Management Studies and Mercury Investigation (CBDA); 5) conduct a Dredger Tailing Workgroup; and 6) complete the Atlas of Spawning Riffles Within the San Joaquin Tributaries (AFRP).

Objective 4: Enhance and ensure adequate flow and water quality.
Project gap: Develop the San Joaquin Basin water supply plan.
Project target: Develop a San Joaquin Basin water supply plan.

Mainstem San Joaquin River

Objective 1: Enhance and ensure adequate flow and temperature.
Project gap: Identify and attempt to implement actions that will maintain sufficient flow and mean daily water temperatures between 61°F and 65°F for at least one month from April 1 to June 30.
Project target: 1**) Fish population model upgrade**, 2) conduct a San Joaquin Basin integrated water temperature model and flow study.

Objective 2: Acquire and restore anadromous fish habitat.
Project gap: Acquire and enhance riparian easements for salmonids.
Project target: 1) Acquire riparian habitat parcels from willing sellers; 2) implement the San Joaquin River National Wildlife Refuge non-structural flood plain project.

Objective 3: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Construct fish screens at diversion intakes on the lower San Joaquin River by implementing the Anadromous Fish Screen Program CVPIA 3406(b)(21) in conjunction with other programs.
Project target: 1) Implement the Patterson Irrigation District Positive Barrier Fish Screen (CBDA); and 2) support the design and construction of pump and diversion screens.

Stanislaus River

Objective 1: Enhance and ensure adequate flow.
Project gap: Identify and provide appropriate water flow for critical salmonid life history stages.
Project target: 1) Evaluate fall pulse flow benefits for salmonid attraction and passage; and 2) evaluate flows for out-migration, passage and rearing of salmonids (AFRP).

Objective 2: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Identify causes of juvenile salmonid mortality. Construct diversion intake screens, isolate ponded sections of the river and conduct studies to determine the magnitude and distribution of the predation problem.

Project target: 1) Identify all diversions in need of screens and any migration impediments; 2) isolate ponded areas; 3) encourage other programs associated with fish passage improvement projects; 4) conduct a comprehensive study of predation on juvenile salmonids; and 5) implement Oakdale Recreation Ponds restoration.

Objective 3: Acquire and restore anadromous fish habitat.
Project gap: Develop geomorphic and restoration assessments and implement sediment restoration actions.
Project target: 1) Identify sediment problems and create a management plan with potential solutions; 2) implement Oakdale Recreation Ponds restoration; 3) implement the Spawning Gravel Augmentation Program (USBR); and 4) Restore in channel, side channel and floodplain habitat in the Lover's Leap reach.

. Objective 4: Acquire and restore anadromous fish habitat.
Project gap: Acquire-riparian easements and acquisitions and restore floodplain connectivity and riparian and shaded riverine aquatic habitat.
Project target: 1) Acquire riparian land and easements from willing sellers as available; 2) restore the Floodplain at Knight's Ferry; 3) restore the Mohler tract (AFRP); 3) study spatial and temporal distribution of food for rearing juvenile salmonids; and, 4) conduct Lovers Leap and Knights Ferry Floodplain and side channel restoration and monitoring (AFRP and DWR).

Objective 5: Improve understanding of life history requirements.
Project gap: Evaluate limiting factors for salmon and steelhead in the Stanislaus River.
Project target: 1) **Conduct a predation study,** 2) **life-stage contribution study**, 3) coded-wire tag wild juvenile Chinook salmon to determine contribution of fry, parr and smolt emigrants to adult recruitment from the San Joaquin Basin; and 4) conduct limiting factors analysis for salmonids.

Objective 6: Watershed management.
Project gap: Establish and develop a restoration plan.
Project target: 1) Conduct an adaptive management forum on the Stanislaus River; and 2) create a comprehensive restoration plan (AFRP).

Tuolumne River

Objective 1: Enhance and ensure adequate flow.
Project gap: Acquire additional flows and maintain flows at levels needed by anadromous salmonids.

Project target: 1) Complete Infiltration Gallery at Special Run Pool 9; 2) Apply the Environmental Water Program (CBDA); and 3) implement the Up-migration and Straying of Tuolumne River Salmonids in Response to Fall Attraction Flows and Environmental Factors (AFRP).

Objective 2: Enhance and ensure adequate water temperature.
Project gap: Monitor and insure a water temperature of 56°F between October 15 to February 15 and 65°F from April 1 to October 1 within salmonid spawning habitat.
Project target: 1) Apply the Environmental Water Program (CBDA); 2) construct Infiltration Gallery; and 3) Participate in the Tuolumne River FERC Settlement Agreement process.

Objective 3: Improve understanding of life history requirements.
Project gap: Determine egg-fry survival rates, rearing habitat preferences, and growth rates of Chinook salmon and steelhead.
Project target: 1) **Life-stage contribution study**, 2) Study juvenile salmon habitat utilization and ecology; and 3) steelhead trout abundance and distribution (Tuolumne River Technical Advisory Committee).

Objective 4: Acquire and restore anadromous fish habitat.
Project gap: Replenish spawning gravel and reduce sedimentation; and acquire instream and riparian habitat for salmonid use.
Project target: 1) Restore the Warner-Deardorff segment (CBDA); 2) implement Tuolumne River – Big Bend project (CBDA); 3) implement MJ Ruddy Restoration Project (CBDA and AFRP); 4) Pursue future gravel introduction opportunities; 5) Restore instream and floodplain habitat at Bobcat Flat (CBDA); 6) Restore Tuolumne River Special Run Pool 10; 7) **Dos Rios conservation easement (add-on to Two-Mile Bar project)** at Tuolumne River confluence; and 8) implement the Tuolumne River Sediment Acquisition and Spawning Gravel Transfusion Project (CBDA).

Objective 5: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Construct fish screens at diversion intakes.
Project target: Construct Tuolumne River diversion screens.

Objective 6: Provide education and outreach.
Project gap: Establish a stream watch program to increase public participation in river management.

Project target: 1) Develop the Tuolumne River Coalition (CBDA); 2) CDFG and Stanislaus County partnerships; develop the Interpretive Center in La Grange; and 3) implement the Tuolumne River Watershed Stewardship Project (CBDA).

Merced River

Objective 1: Enhance and ensure adequate flow.
Project gap: Acquire additional flows needed by anadromous salmonids.
Project target: 1) Support Merced River Water Temperature Modeling Studies ; and 2) apply the Environmental Water Program (CBDA).

Objective 2: Enhance and ensure adequate flow.
Project gap: Evaluate fall pulse flows and ramping rates for egg mortality, redd dewatering and juvenile stranding.
Project target: Environmental Water Acquisition Program (CBDA).

Objective 3: Improve understanding of life history requirements.
Project gap: Determine egg-fry survival rates, rearing habitat preferences, and growth rates of Chinook salmon.
Project target: 1) **Life-stage contribution study** and 2) Conduct baseline biological monitoring of the Merced River (DWR), and 3) **pilot studies of Alaska Weirs/Vaki River Watchers for Merced river**

Objective 4: Acquire and restore anadromous fish habitat.
Project gap: Replenish spawning gravel and reduce sedimentation; acquire instream and riparian habitat for salmonid use; and investigate reintroduction of anadromous salmonids above existing fish barriers.
Project target: 1) Support the Dredger Tailings Reach Restoration project (CBDA); 2) acquire and restore the Magneson property; 3) Modify aggregate mining reclamation plan for Bettencourt Ranch ; 4) Explore future opportunities for mining industry and restoration collaboration; and 5) Feasibility study to investigate the reintroduction of anadromous salmonids above the Crocker-Huffman Dam on the Merced River (AFRP).

Objective 5: Control and minimize effects of non-native invasive fish and plants.
Project Gap: Invasive species control.
Project Target: Manage of invasive species in recently restored reaches.

Objective 6: Reduce passage impediments including stranding, entrainment, and predation.
Project gap: Construct fish screens at diversion intakes on the Merced River.
Project target: Design Merced River diversion screens.